



Mark Gordon, Governor

## Department of Environmental Quality

*To protect, conserve and enhance the quality of Wyoming's  
environment for the benefit of current and future generations.*



Todd Parfitt, Director

### IN THE MATTER OF A PERMIT APPLICATION (A0014739) FROM ARBOR WORKS TREE SERVICE (CMP100753) TO CONSTRUCT THE STOCKPILE SITE IN TRACT 6 (F031122).

#### DECISION

#### I. INTRODUCTION:

The Air Quality Division of the Wyoming Department of Environmental Quality (Division) received a permit application from Arbor Works Tree Service, to operate a portable air curtain burner at the Stockpile Site in Tract 6 (F031122) initially located in Section 36, T42N, R117W, in Teton County, Wyoming.

The Division conducted an analysis of this application and on April 26, 2023, published a public notice of proposed intent to approve the application in the Jackson Hole News & Guide, Wyoming and online at <https://openair.wyo.gov>. The public notice stated that the permit application, agency's analysis, and the public notice were available for public inspection and that the material could also be viewed at the Open-Air URL utilizing a public computer at the Teton County Public Library. On the same day, the Division also provided a copy of the public notice for public inspection at the Teton County Clerk's Office. The public notice period ran from April 26, 2023, through May 26, 2023. On June 21, 2023, the Division published in the Jackson Hole News & Guide, Wyoming a notice of public hearing. The public hearing was held at 9:00 am, Friday, July 7, 2023, in the Teton County Library Jackson Branch Ordway Auditorium, located at 125 Virginian Lane, Jackson, in Teton County, Wyoming. The Division received 18 written comments and an additional 7 verbal comments at the public hearing. Comments that were received during the public comment period and at the public hearing have been considered.

#### II. ANALYSIS OF COMMENTS:

##### Comment #1

The Division received comments expressing concern that air quality dispersion modeling results conducted by Air Resource Specialists, Inc. (ARS) on behalf of a commenter demonstrated that the air curtain burner would cause violations of the National Ambient Air Quality Standards (NAAQS) for nitrogen dioxide (NO<sub>2</sub>).

##### Response

The National Ambient Air Quality Standards (NAAQS) and the Wyoming Ambient Air Quality Standards (WAAQS) listed in the Wyoming Air Quality Standards and Regulations (WAQSR) are health- and welfare-based air pollution standards.<sup>1</sup> Primary ambient air quality standards are set at levels protective of public health, including the health of populations that may be more sensitive to air contaminants such as individuals with underlying lung disease, children and the elderly. Secondary ambient air quality standards are set at levels protective of public welfare. For oxides of nitrogen, EPA set primary (annual and 1-hour averaging times) and secondary (annual) NAAQS, using nitrogen dioxide (NO<sub>2</sub>) as the indicator.<sup>2</sup> Wyoming's WAAQS match the EPA's NAAQS. See WAQSR, Ch. 2, Sec. 3. The level of the primary 1-

<sup>1</sup> Ambient air is that portion of the atmosphere, external to buildings, to which the general public has access. WAQSR Ch. 2, Sec. 1.

<sup>2</sup> See 40 CFR § 50.11. Gaseous oxides of nitrogen include nitrogen dioxide (NO<sub>2</sub>), nitric oxide (NO), and their gaseous reaction products. NO<sub>2</sub> and NO are often grouped together and referred to as NO<sub>x</sub>. See 42 USC § 7408(c); 83 Fed. Reg. 17226, 17231 (Apr. 18, 2018).

hour oxides of nitrogen ambient standard is 53 parts per billion (ppb) annual average concentration measured in the ambient air as nitrogen dioxide (NO<sub>2</sub>). *Id.* To meet the primary 1-hour standard, the three-year average of the annual 98th percentile of the daily maximum 1-hour average NO<sub>2</sub> concentration must be less than or equal to 100 ppb (188 µg/m<sup>3</sup>). *Id.*<sup>3</sup>

Section 9.0 of the Division's Application Analysis stated that "ambient air quality standards will be maintained with the utilization of the control measures recognized as BACT [Best Available Control Technology] for this type of operation. The Division received comments expressing concern that the air curtain burner would cause violations of the NO<sub>2</sub> NAAQS. One of the comments included an attachment prepared by Air Resource Specialists (ARS). ARS stated that it performed an air quality dispersion modeling analysis and "determined that nitrogen oxide (NO<sub>x</sub>) emissions from the air curtain burner would not meet the [1-hour NO<sub>2</sub> NAAQS]." ARS' modeling predicted that the 1-hour NO<sub>2</sub> concentration was 329.5 µg/m<sup>3</sup> which would exceed the concentration of 188 µg/m<sup>3</sup> needed to meet the standard.

After reviewing the commenters' concern, including the associated ARS modeling report, the Division engaged its contractor (Ramboll) to evaluate the modeling conducted by ARS. Ramboll reviewed the modeling files and modeling report submitted by ARS (Ramboll's review is attached hereto as Appendix A). Ramboll reviewed ARS' analysis for consistency with the modeling files, Wyoming Guidance for Conducting Near-Field Modeling Analyses for Minor Sources, and using professional judgment. Ramboll found that ARS' modeling contained several errors (see Appendix A). When Ramboll reran the model with the necessary corrections, Ramboll determined that the predicted impact from the air curtain burner would be 157.3 µg/m<sup>3</sup> (including a background value of 13 µg/m<sup>3</sup>), which is less than the 1-hour NO<sub>2</sub> NAAQS/WAAQS of 188 µg/m<sup>3</sup>. Ramboll's finding is consistent with and confirms the Division's analysis that the NO<sub>2</sub> ambient air quality standards would be maintained. Therefore, the Division is satisfied that the proposed air curtain burner will not prevent the attainment or maintenance of the NO<sub>2</sub> ambient air quality standard as long as the air curtain burner is located in an area that has been designated as attainment/unclassifiable for NO<sub>2</sub> or Ozone (NO<sub>x</sub> is an ozone precursor emission).<sup>4</sup>

Arbor works' application indicates that the air curtain burner facility will initially be located in Teton County and may be relocated to other areas within Wyoming. In 2012, EPA designated the Upper Green River Basin (UGRB) area of Wyoming as a non-attainment area for the 2008 Ozone Standard. NO<sub>x</sub> is an ozone precursor emission. NO<sub>2</sub> and NO are often grouped together and referred to as NO<sub>x</sub>. (see footnote 2 above). Therefore, in response to commenters' concerns related to the potential for violations of the ambient standards, the Division has revised permit condition no. 6 to restrict the air curtain burner from being relocated to the UGRB 2008 ozone nonattainment area.

#### **Comment #2**

The Division received comments regarding concern over smoke and opacity associated with operation of the air curtain burner.

#### **Response**

The Division agrees with commenters to limit the opacity from the air curtain incinerator to 10% opacity after a 30-minute start-up period. The Division considers limiting the opacity to 10% after a 30-minute start-up period, and ensuring the air curtain burner is operated accordance to the operating manual as representing BACT for this type of operation. Proposed permit conditions will require Arbor Works Tree Service to control opacity at the site, which is as follows:

---

<sup>3</sup> The annual primary and secondary standards for NO<sub>2</sub> are met when the annual average concentration of NO<sub>2</sub> in a calendar year is less than or equal to 53 parts per billion (ppb). The 1-hour primary standard is met when the three-year average of the annual 98<sup>th</sup> percentile of the daily maximum 1-hour average concentration of NO<sub>2</sub> is less than or equal to 100 ppb. WAQSR, Ch.2, Sec. 3. EPA has designated all of Wyoming as unclassifiable/attainment for the oxides of nitrogen ambient standard. 40 CFR § 81.351.

<sup>4</sup> NO<sub>x</sub> is an ozone precursor. In 2012, EPA designated the Upper Green River Basin (UGRB) area of Wyoming as a non-attainment area for the 2008 Ozone Standard. Therefore, the permit limits relocation of the air curtain burner to areas outside of the UGRB.

Respective condition from permit:

8. That the visible emissions from the air curtain burner during steady state operations shall not exceed 10% opacity as determined by 40 CFR, Part 60, Appendix A, Method 9. For determining compliance with this condition, the burner will be considered to be in steady state operations after 30 minutes of operation from ignition.

**Comment #3**

The Division received comments regarding the location of the site.

**Response**

The WAQSR requires that facilities be located in accordance with proper land use planning as determined by the appropriate State or local agency charged with such responsibility. The applicant provided a copy of temporary use permit TUP-03344 issued by the Wyoming Board of Land Commissioners. Therefore, the Division is satisfied that the air curtain burner will initially be located in accordance with proper land use planning. Furthermore, should Arbor Works Tree Service relocate the air curtain burner, the last paragraph of the permit requires Arbor Works to “comply with all applicable county, state, and federal standards, regulations or ordinances.” In response to this comment, the Division has also revised permit condition no. 6 to restrict the air curtain burner from being relocated to the UGRB 2008 ozone nonattainment area.

**Comment #4**

The Division received comments regarding monitoring to ensure regulations are followed.

**Response**

Division personnel will be conducting periodic inspections (announced and unannounced) at the Stockpile Site in Tract 6 to insure compliance with permit conditions. Questions regarding compliance with the permit conditions should be directed to the District Engineer, (307) 335-6937 or Stationary Source Compliance Program Manager, Cheyenne (307) 777-3774. The public should also contact the Division if there are concerns with permit compliance.

Also, in response to these comments, the Division has added the following monitoring/testing language to the permit: Arbor Works Tree Service shall submit a quarterly 40 CFR, Part 60, Appendix A, Method 9 observation. Documentation of the observation shall be maintained for a period of at least five (5) years and made available upon request.

**Comment #5**

The Division received comments regarding stockpiles of ash/biochar at the site.

**Response**

Biochar (aka biological charcoal) is made from heating organic materials at high temperatures under anaerobic conditions “resulting in a carbon-rich, porous biochar product.” See, Biochar: What is it and what does it do?, Univ. of Wyo. Extension Dept., Barnyards and Backyards, pgs. 12-14 (Spring 2019) (<https://www.uwyo.edu/barnbackyard/files/documents/magazine/2019/spring/0419biochar.pdf>). Biochar applications include soil amendments and soil health improvement, environmental mitigation and site remediation, carbon sequestration. See, USDA/USFS, “Biochar” avail. at <https://www.fs.usda.gov/research/rmrs/forestproducts/biochar>.

The Applicant indicated that the biochar may be stored on-site until it is transported off-site. Therefore, the applicant will be required to follow the general requirements under Chapter 3, Section 2 of the WAQSR for control of any fugitive dust associated with stockpiles of ash/biochar. Other comments related to ash/biochar fall outside the scope of the Air Quality Division’s jurisdictional authority. See also Response to Comments 12 and 13. No changes will be made to the permit as a result of these comments.

Comment #6

The Division received comments regarding revenue generated for the site.

Response

The Division has no jurisdiction over revenue generated from the site and does not consider it in determining whether an air quality permit should be granted or denied. No changes will be made to the permit as a result of these comments.

Comment #7

The Division received comments concerned with wildlife in the area.

Response

The Division issues permits as proposed in the application and is required to make sure that the proposed equipment meets the requirements of the WAQSR and Wyoming Environmental Quality Act (WEQA). The Division's analysis stated that ambient air quality standards would be maintained with Arbor Works utilization of the control measures recognized as BACT.

Primary ambient standards are health-based standards whereas the secondary standards are based on welfare (plants and animals). The secondary standards are equivalent to or less stringent than the primary standards. Since it was demonstrated that the Stockpile Site in Tract 6 meets the ambient standards for particulate matter and the other standards, the Division considers the permit as being protective of wildlife and ecological systems surrounding the Stockpile Site in Tract 6. In response to this comment, Division has also revised permit condition no.6 to restrict the air curtain burner from being relocated to the UGRB 2008 ozone nonattainment area.

Comment #8

The Division received comments regarding the traffic on roads outside of the facility's boundary.

Response

Road usage caused by operations of the air curtain burner are outside the jurisdiction of the air quality division and cannot be considered in issuing or denying an air quality permit. Use and maintenance of public roads that are outside of a facility boundary falls to other governmental entities in accordance with their statutory authorities. Therefore, commenters may contact those agencies with their concerns. The Teton County Public Works department may be reached at 307-733-3317. No changes will be made to the permit as a result of these comments.

Comment #9

The Division received comments regarding limited operating hour not being a condition in the permit.

Response

Operating hours for this site that were used in the calculation of emissions and are enforceable under Condition 2 of the final permit. Condition 2 states:

Respective condition from permit:

2. That all substantive commitments and descriptions set forth in the application for this permit, unless superseded by a specific condition of this permit, are incorporated herein by this reference and are enforceable as conditions of this permit.

No changes will be made to the permit as a result of these comments.

**Comment #10**

The Division received comments regarding alternative disposal options for the wood waste.

**Response**

The Division's BACT analysis and the range of emission limits and control measures considered in the Division's analysis are driven by the definition of the facility proposed by the applicant. In this case, Arbor Works' application proposed an air curtain burner facility. The BACT process is not a means to redefine a facility. Commenters' request for the applicant to propose a different wood-waste process or facility instead of the applicant's proposed air curtain burner would redefine the source. Therefore, no changes will be made to the permit as a result of these comments.

**Comment #11**

The Division received comments regarding air pollution monitoring in the valley.

**Response**

The Division has a monitor in Jackson and the data can be viewed at <https://www.wyvisnet.com>. No changes will be made to the permit as a result of this comment.

**Comment #12**

The Division received comments regarding whether biochar affects the physical and chemical properties of soil.

**Response**

The potential use of biochar falls outside the jurisdiction of the air quality division and cannot be considered in issuing or denying an air quality permit. The applicable local Conservation District or USDA Natural Resources Conservation Service may be potential resources for commenters to contact if they have questions regarding use of biochar for specific soil types. See also Response to Comments 5 and 13. No changes will be made to the permit as a result of this comment.

**Comment #13**

The Division received comments regarding whether biochar presents risks to the aquatic environment.

**Response**


The potential use of biochar falls outside the jurisdiction of the AQD and cannot be considered in issuing or denying an air quality permit. Issues related to water quality and potential contamination fall under the authority of the WDEQ's Water Quality Division (WQD), which implements regulatory and non-regulatory programs to protect Wyoming's water quality. The applicant does not need to obtain any WQD permits for the facility; however, the WQD has advised the applicant to plan and implement best management practices (BMPs) to ensure the proper storage and handling of ash and biochar at the site. With the use of appropriate BMPs, the WQD expects little to no potential for surface water or groundwater contamination. Commenters may contact the WDEQ Water Quality Division with questions at (307) 777-7781. No changes will be made to the permit as a result of this comment.

IV. DECISION:

The Division's review and analysis of Arbor Works Tree Service's original and revised applications, and consideration of comments received during the public comment and Arbor Works Tree Service's subsequent response, the Department of Environmental Quality has determined that the permit application filed by Arbor Works Tree Service complies with all applicable Wyoming Air Quality Standards and Regulations and that a permit will be issued to Arbor Works Tree Service

Dated the 29th day of February, 2024

  
\_\_\_\_\_  
Nancy E. Vehr  
Administrator  
Wyoming Air Quality Division

  
\_\_\_\_\_  
Todd Parfitt  
Director  
Wyoming Department of Environmental Quality

# **Appendix A**

## **Modeling Results**

**Memorandum**

Title: Arbor Works Tree Service Independent Air Dispersion Modeling Review  
 To: Andrew Keyfauver (Wyoming Dept. of Environmental Quality)  
 From: Jason Reed and Pao Baylon (Ramboll)  
 cc:  
 Date 8/31/23

Ramboll is pleased to submit this memorandum summarizing our independent review of the air dispersion modeling conducted by Air Resource Specialists, Inc. (ARS) on behalf of Teton Village Association with regard to Arbor Works Tree Service's (AWTS) application A0014739 to install and operate a portable air curtain burner in Teton County, 1.5 miles south of Teton Village. The modeling files and report were provided by the Wyoming Department of Environmental on August 25, 2023.

Ramboll reviewed the modeling files and modeling report submitted by ARS on behalf of Teton Village Association with regard to AWTS' application A0014739 to install and operate a portable air curtain burner (Air Burner S-223) at various locations throughout Wyoming. The purpose of the Air Burner S-223 is to reduce wood waste by 95% by burning down logs, wood chips, stumps, and firewood biproducts in a contained and controlled environment. The Air Burner S-223 is powered by a 75 hp Hatz diesel-fired generator engine.

Ramboll reviewed the analysis submitted by ARS for consistency with the modeling files, Wyoming Guidance for Conducting Near-Field Modeling Analyses for Minor Sources, and using professional judgment. The findings from this review are summarized below.

Conclusions:

- The conclusion in the ARS Air Quality Dispersion Modeling Report (e.g., the proposed AWTS air curtain burner will exceed the 1-hour NO<sub>2</sub> NAAQS violation) is not correct.
- The modeling report states that NO<sub>2</sub> modeling was performed using the ARM2 option and that the modeled 1-hour NO<sub>2</sub> impact (the maximum 8<sup>th</sup> highest impact) from the burner was 329.5 µg/m<sup>3</sup>, which exceeds the NAAQS (no background concentration added yet) value of 188 µg/m<sup>3</sup>. However, review of the modeling files indicates that the dispersion analysis assumed no NO<sub>x</sub> chemistry. This method is an overly-conservative screening approach because it assumes that all NO<sub>x</sub> emissions immediately convert to NO<sub>2</sub>. When correcting for the NO<sub>x</sub> chemistry method (e.g., using ARM2 as stated in the report and with default minimum and maximum NO<sub>2</sub>/NO<sub>x</sub> ratios of 0.5 and 0.9, respectively), the modeled 1-hour NO<sub>2</sub> impact is reduced to 144.3 µg/m<sup>3</sup>. In addition, the reported impact of 329.5 µg/m<sup>3</sup> is the maximum 8<sup>th</sup> highest value, which is not the form of the 1-hour NO<sub>2</sub> standard. The form of the 1-hour NO<sub>2</sub> standard is 98<sup>th</sup> percentile of the daily maximum 1-hour concentrations. AERMOD will only invoke the correct statistical processing for the form of the standard when the pollutant ID is set to NO<sub>2</sub> and the averaging time is set to 1. The modeling files used a pollutant ID of NO<sub>x</sub>, thus disabling the required processing. When added to a background concentration (discussed below), the total impact is less than the 1-hour NO<sub>2</sub> NAAQS as shown in **Table 1**.



**Table 1**

<b>ARS Report</b>	<b>Corrected Results</b>	<b>Background Value</b>	<b>Total Concentration</b>	<b>NAAQS</b>
329.5 µg/m <sup>3</sup>	144.3 µg/m <sup>3</sup>	13 µg/m <sup>3</sup>	157.3 µg/m <sup>3</sup>	188 µg/m <sup>3</sup>

It is important to note that air dispersion modeling is not prescriptive and requires assumptions and professional judgment. As noted below, there are some potential analysis gaps and need for clarifications.

Potential analysis gaps:

- Ramboll did not receive the emission inventory (EI), therefore could not evaluate if the maximum hourly NO<sub>x</sub> emissions from the diesel-fired generator powering the burner were selected. The ARS report quoted an emission rate of 9 lb/hr, but it is unclear where this came from given the size of the engine and listed emission factor of 3.3 g/hp-hr.
- ARS processed a single year of meteorological data (2021) using surface data from Jackson Hole Airport and upper air data from Riverton. The use of a one-year dataset may not adequately capture worst-case meteorological conditions since it is not site-specific data. For major New Source Review (NSR) projects, EPA requires the use of the most recent five years of adequately representative National Weather Service (NWS) data (or at least one year of site-specific or at least three years of prognostic data. Since this is not a major source NSR project, WDEQ has the discretion to use less than 5 years of NWS data. The use of a single year could be considered adequate for a screening analysis.
- A cumulative NAAQS impact analysis involves assessing ambient impacts from potential emissions resulting from the project and emissions from any nearby co-contributing sources, and then adding a background concentration value to the modeled result that is appropriate for the criteria pollutant/averaging period at the facility location. ARS did not provide any background concentrations. However, Ramboll identified the Northwest International Air Quality Environmental Science and Technology Consortium (NW AIRQUEST) backgrounds tool as a potential resource for 1-hour NO<sub>2</sub> background at the facility. The AWTS facility is located at the center of four NW AIRQUEST grid points. For conservatism, the highest value among the four grid points could be selected as representative background for the facility. This value is 6.7 ppb (13 µg/m<sup>3</sup>) and must be added to the modeled impacts and impacts from any co-contributing sources to calculate a total impact that would then be compared to the 1-hour NO<sub>2</sub> NAAQS.

Limitations of analysis:

- Future modeling could also include the generator as an emission source; on a ton-per-year basis, the generator emits substantially less emissions than the burner.
- Ramboll briefly reviewed the meteorological processing, but did not attempt to recreate it.
- ARS contends that ash emissions, fugitive dust emissions associated with transport of ash offsite, and fugitive dust emissions associated with transport of wood waste materials from offsite to the site and then from the staging area to the burner must be evaluated. These would only impact PM emissions, not NO<sub>2</sub> modeling. Further clarification is needed on whether the remaining ash pile will be transported offsite or if it will be mixed with the soil.

Ramboll based its review of the provided information, i.e., 1-hour NO<sub>2</sub> modeling files and associated report. The review was also based on our knowledge of the Wyoming Guidance for Conducting Near-Field Modeling Analyses for Minor Sources and experience with air quality modeling.